LISTING OF THE CLAIMS:

1. (Currently Amended) A method of determining a rhythmic beat of a digital sound signal, said method comprising:

(a) down sampling the digital signal by a predetermined factor to produce a decimated signal comprising a plurality of first data points;

(b) grouping said plurality of first data points into groups each comprising a ~~perdetermined~~ predetermined number of said first data points of said decimated signal and summing absolute values of said data points in each of said groups to produce a group-summed signal comprising a plurality of second data points;

(c) dividing said plurality of second data points of said onset peak train into a plurality of successive frames of uniform duration;

(d) determining for each of said frames a threshold value and detecting, within each of said frames, peak profiles each comprising successive ones of said second data points having values greater than said threshold value;

(e) detecting, within each of said peak profiles, a peak point having a greatest value among said successive ones of said second data points; and

(f) determining a match between (i) said peak point and ones of said second data points located at least one of before and after said peak point and (ii) one of a plurality of unit data pulse sequences, having different periods, in accordance with an algorithm, wherein

said rhythmic beat is determined to correspond to the period of said one of said unit pulse sequences, wherein

said threshold value is defined by a relation (A + M')/2, where A is the average of the values of all of said second data points within one of said frames and M' is the maximum of the values of all of said second data points within said one of said frames.

2. (Original) A method according to claim 1, further comprising, prior to step (c), processing said second data points in accordance with a smooth-and-differentiate algorithm.

3. (Original) A method according to claim 2, wherein said smooth-and-differentiate algorithm comprises a rectification step including setting to zero all of said second data points having values less than zero.

4-6. (Canceled).

7. (Currently Amended) A method according to claim ~~4~~ 1, wherein step (f) comprises calculating a function

Sum_i (n) = x(M) + x(M+n) + x(M+2n) + ... + x(M-n) + x(M-2n)

where, for said first one of said frames, x is a signal representing the onset peak train, i is a selected peak point index, M is a peak point position, and n is a period of the unit pulse sequences, where n ranges from a first integer number to a second integer number, (ii)

calculating $Sum(n) = \Sigma_i Sum_i(n)$, and (iii) determining a value of n=N resulting in a greatest $Sum(n) = \Sigma_i Sum_i(n)$, wherein said match is determined to exist with said one of said unit pulse sequences having a pulse period equal to N, and said rhythmic beat is determined to correspond to period N.

8. (Original) A method according to claim 7, further comprising a check frame decision step (g) comprising:

(i) with respect to a second frame of said plurality of successive frames which immediately succeeds said first one of said frames, performing a check frame decision processing by calculating a function $Sum_i(n) = x(M) + x(M+n) + x(M+2n) + \ldots + x(M-n) + x(M-2n)$, where, for said second frame, x is a signal representing the onset peak train, i is a selected peak point index, M is a peak point position, and n is a period of the unit pulse sequences, where n ranges from $n = N - L$ to $n = N + L$, where L is an integer which is less than a difference between said first and second integers, calculating $Sum(n) = \Sigma_i Sum_i(n)$ and determining whether N yields a peak in Sum(n) for said check frame processing of said second frame;

(ii) if step (g)(i) determines that N yields said peak in Sum(n) for said check frame processing of said second frame, said rhythmic beat for said first frame and for said second frame is determined to correspond to period N and a third frame immediately succeeding said second frame is processed in accordance with step (g)(i); and

(iii) if step (g)(i) determines that N does not yield said peak in Sum(n), said rhythmic beat for said second frame is determined to correspond to period N and a third frame immediately succeeding said second frame is processed in accordance with step (f).

9. (Currently Amended) An apparatus for determining a rhythmic beat of a digital sound signal, said apparatus comprising:

(a) decimation means for down sampling the digital signal by a predetermined factor to produce a decimated signal comprising a plurality of first data points;

(b) group summation means for grouping said plurality of first data points into groups each comprising a predetermined number of said first data points of said decimated signal and summing absolute values of said data points in each of said groups to produce a group-summed signal comprising a plurality of second data points;

(c) means for dividing said plurality of second data points of said onset peak train into a plurality of successive frames of uniform duration;

(d) determination means for determining for each of said frames a threshold value and for detecting, within each of said frames, peak profiles each comprising successive ones of said second data points having values greater than said threshold value;

(e) detection means for detecting, within each of said peak profiles, a peak point having a greatest value among said successive ones of said second data points; and

(f) match detection means for determining a match between (i) said peak point and ones of said second data points located at least one of before and after said peak point and (ii) one of a plurality of unit data pulse sequences, having different periods, in accordance with an algorithm, wherein said rhythmic beat is determined to correspond to the period of said one of said unit pulse sequences, wherein said threshold value is defined by a relation $(A + M')/2$, where A is the average of the values of all of said second data points within one of said frames and M′ is the maximum of the values of all of said second data points within said one of said frames.

10. (Original) An apparatus according to claim 9, further comprising means for processing said second data points in accordance with a smooth-and-differentiate algorithm prior to said second data points being divided into said frames.

11. (Original) An apparatus according to claim 9, wherein said means for processing in accordance with said smooth-and-differentiate algorithm comprises a rectification step including setting to zero all of said second data points having values less than zero.

12-14. (Canceled).

15. (Currently Amended) An apparatus according to claim ~~12~~ 9, wherein said match detection means comprises means for performing a full processing operation comprising calculating a function

Sum_i (n) = x(M) + x(M+n) + x(M+2n) + ... + x(M-n) + x(M-2n)

where, for said first one of said frames, x is a signal representing the onset peak train, i is a selected peak point index, M is a peak point position, and n is a period of the unit pulse sequences, where n ranges from a first integer number to a second integer number, (ii) calculating Sum(n) = Σ_i Sum_i(n), and (iii) determining a value of n=N resulting in a greatest Sum(n) = Σ_i Sum_i(n), wherein said match is determined to exist with said one of said unit pulse sequences having a pulse period equal to N, and said rhythmic beat is determined to correspond to period N.

16. (Original) An apparatus according to claim 15, further comprising (g) a check frame decision means for:

(i) with respect to a second frame of said plurality of successive frames which immediately succeeds said first one of said frames, performing a check frame decision processing by calculating a function Sum_i (n) = x(M) + x(M+n) + x(M+2n) + ... + x(M-n) + x(M-2n), where, for said second frame, x is a signal representing the onset peak train, i is a selected peak point index, M is a peak point position, and n is a period of the unit pulse sequences, where n ranges from n = N - L to n = N + L, where L is an integer which is less than a difference between said first and second integers,

calculating Sum(n) = Σ_i Sum$_i$(n) and determining whether N yields a peak in Sum(n) for said check frame processing of said second frame;

(ii) if operation (g)(i) determines that N yields said peak in Sum(n) for said check frame processing of said second frame, said rhythmic beat for said first frame and for said second frame is determined to correspond to period N and a third frame immediately succeeding said second frame is processed in accordance with operation (g)(i), and

(iii) if operation (g)(i) determines that N does not yield said peak in Sum(n), said rhythmic beat for said one of said second frame is determined to correspond to period N and said third frame is processed in accordance with said full processing operation.